

CLAIMS

What Is Claimed Is:

- 1 Claim 1. A compact banknote dispensing device, comprising:
 - 2 a banknote supply storing section for storing one or more banknotes;
 - 3 a banknote transporting unit for transporting a stored banknote, the banknote
 - 4 transporting unit being adjacent to the banknote supply storing section for receiving a stored
 - 5 banknote from the banknote supply storing section,
 - 6 wherein the banknote transporting unit includes rollers defining a U-shaped
 - 7 transporting path;
 - 8 a banknote length detection unit located within the banknote transporting unit
 - 9 for detecting the length of transported banknotes; and
 - 10 a dispensing slot for dispensing the transported banknotes.
- 1 Claim 2. The compact banknote dispensing device of Claim 1,
 - 2 wherein the banknote supply storing section is inclined at an angle to permit
 - 3 the stored banknotes to be stored in a more compact longitudinal distance and to facilitate
 - 4 discharging of banknotes in a downward direction.
- 1 Claim 3. The compact banknote dispensing device of Claim 1,
 - 2 wherein the U-shaped transporting path includes a first roller, a guiding roller
 - 3 and a second transporting roller, the first roller being adjacent to the banknote supply storing
 - 4 section, the guiding roller being adjacent the first roller to receive the banknote on a side
 - 5 opposite to the side of the first roller, the second roller being disposed on the side of the first
 - 6 roller on a side opposite to the guiding roller to enable the transported banknote to traverse a
 - 7 U-shaped path around the first roller, the guiding roller, and the second roller, and

8 wherein the banknote length sensor is disposed adjacent to the U-shaped
9 transporting path.

1 Claim 4. The compact banknote dispensing device of Claim 3,
2 wherein the banknote length sensor unit is adjacent to the U-shaped
3 transporting path, the banknote length sensor comprising a first banknote sensor and a second
4 banknote sensor, the first banknote sensor being adjacent to the first roller to detect the
5 banknote as it is received by the first roller, the second banknote sensor being disposed
6 between the guiding roller and the second roller so that the first sensor and the second sensor
7 are spaced at a distance along the U-shaped transporting path that is less than the length of
8 the shortest valid banknote.

1 Claim 5. A compact banknote dispensing device, comprising:
2 a banknote supply storing section for storing one or more banknotes;
3 a banknote discharging unit for discharging a banknote from the banknote
4 supply storing section at a first predetermined speed, the banknote discharging unit being
5 adjacent to the banknote supply storing section;
6 a banknote transporting unit for receiving a discharged banknote from the
7 banknote discharging unit and transporting the discharged banknote at a second
8 predetermined speed from the banknote supply storing section, the second predetermined
9 speed being faster than the first predetermined speed,
10 wherein the banknote transporting unit includes a first roller and a first
11 pressing roller disposed adjacent to the banknote supply storing section, the first roller and
12 the first pressing roller rotating oppositely and being arranged so their axes of rotation are
13 parallel to each other to conduct a discharged banknote between the first roller and the first
14 pressing roller in a direction away from the banknote discharging unit, the first roller and first

15 pressing roller having multiple radial projections on the peripheral surface of each roller with
16 one or more intermediate radial projection free portions, the radial projections on the first
17 roller being interposed with the radial projections of the first pressing roller to enable the first
18 roller and the first pressing roller to retain and conduct a discharged banknote in a wave-like
19 manner.

1 Claim 6. The compact banknote dispensing device of Claim 5, further comprising:
2 a first sensor for detecting the presence of a banknote received by the
3 transporting unit, the first sensor outputting a first signal to indicate the presence of the
4 banknote adjacent to the first sensor;
5 a second sensor for detecting the presence of a banknote discharged by the
6 transporting unit, the second sensor outputting a second signal to indicate the presence of the
7 banknote adjacent to the second sensor; and
8 a control unit for receiving and processing the first signal and the second
9 signal, the control unit comparing the first signal with the second signal to determine whether
10 a banknote has successfully passed through the transporting unit.

1 Claim 7. The compact banknote dispensing device of Claim 6, further comprising:
2 a temporary storing section for receiving a predetermined number of
3 discharged banknotes, the temporary storing section being arranged adjacent to the banknote
4 transporting unit,
5 wherein the second sensor is interposed between the banknote transporting
6 unit and the temporary storing section to detect the passage of the discharged banknote into
7 the temporary storing section.

1 Claim 8. The compact banknote dispensing device of Claim 7, further comprising:

2 a dispensing slot for dispensing a predetermined number of discharged
3 banknotes; and

4 a slider member for pushing a predetermined number of discharged banknotes
5 in the temporary storing section out of the temporary storing section to the dispensing slot so
6 that the predetermined number of discharged banknotes protrude out of the dispensing slot.

1 Claim 9. The compact banknote dispensing device of Claim 7,
2 wherein the predetermined number of discharged banknotes is four.

1 Claim 10. The compact banknote dispensing device of Claim 7,
2 wherein the predetermined number of discharged banknotes is nine.

1 Claim 11. The compact banknote dispensing device of Claim 8, further comprising:
2 a third sensor for detecting the presence of a one or more dispensed banknotes ,
3 the third sensor outputting a third signal to indicate the presence of one or more banknotes
4 adjacent to the third sensor, the third sensor being adjacent to the dispensing slot to detect the
5 presence of one or more dispensed banknotes protruding out of the dispensing slot; and
6 an alarm emitter for emitting an audible alarm to indicate an error condition,
7 wherein the third signal is asserted to the control unit to enable the control unit
8 to determine if the dispensed banknotes have been taken by a user, the control unit
9 determining if the banknotes have not been taken by a user for a predetermined amount of
10 time indicates an error condition.

1 Claim 12. The compact banknote dispensing device of Claim 11,
2 wherein the first sensor, the second sensor, and the third sensor are a
3 transmitting photoelectric sensor, a reflecting photoelectric sensor or mechanical sensor.

1 Claim 13. The compact banknote dispensing device of Claim 5, further comprising:

2 a rejected banknote storing section adjacent to the banknote transporting unit;
3 a diverting unit for diverting a banknote from a first path to a second path, the
4 first path being the normal banknote discharge path, the second path being the rejected
5 banknote storage path; and

6 a fourth sensor for detecting the presence of a banknote adjacent the fourth
7 sensor, the fourth sensor outputting a fourth signal to indicate successful passage of the
8 received banknote through an intermediate position of the transporting unit, the intermediate
9 position being along the transporting path at a distance from the first sensor which is less than
10 the length of an acceptable discharged banknote,

11 wherein the first signal and the fourth signal are passed to the control unit, the
12 control unit interpreting the first signal and the fourth signal detecting and non-detecting
13 states to determine the length of the transported discharged banknote, the control unit
14 activating the diverting unit to the non-diverting position when the discharged banknote
15 length is within predetermined acceptable parameters, and

16 wherein the transporting unit includes a guiding unit for extending the travel
17 path in a non-planar manner between the first and the fourth sensors to enable the banknote to
18 be accurately measured while reducing the longitudinal length of the dispensing device.

1 Claim 14. The compact banknote dispensing device of Claim 13, further comprising:
2 a fifth sensor for detecting the presence of a banknote adjacent the fifth sensor,
3 the fifth sensor outputting a fifth signal to indicate successful passage of the received
4 banknote to the rejected banknote storing section.

1 Claim 15. The compact banknote dispensing device of Claim 13,
2 wherein the banknote storing section and the rejected banknote storing section
3 comprise a removable safe unit.

1 Claim 16. The compact banknote dispensing device of Claim 14,
2 wherein the fourth sensor and the fifth sensor are a transmitting photoelectric
3 sensor, a reflecting photoelectric sensor, or mechanical sensor.

1 Claim 17. The compact banknote dispensing device of Claim 13,
2 wherein the first signal is detecting while the fourth signal becomes detecting
3 after which the first signal becomes non-detecting, the control unit measuring the time
4 difference from the fourth sensor detecting and the first sensor non-detecting in order to
5 measure the length of the discharged banknote.

1 Claim 18. The compact banknote dispensing device of Claim 5,
2 wherein the number of radial projections protruding from the peripheral
3 surface of each of the first roller and the first pressing roller is six.

1 Claim 19. A method of discharging and dispensing a banknote, comprising:
2 discharging a banknote from a banknote storing section at a first
3 predetermined speed;
4 transporting a discharged banknote at a second predetermined speed, the
5 second predetermined speed being faster than the first predetermined speed;
6 sensing the length of the discharged banknote in the transporting unit;
7 comparing the sensed length of the discharged banknote to determine if the
8 banknote is acceptable for dispensing;
9 storing one or more discharged banknotes to a temporary storing section when
10 the discharged banknote length is acceptable;
11 diverting the discharged banknote to a rejected banknote storing section when
12 the discharged banknote length is not acceptable;

13 accumulating a predetermined number of acceptable length discharged
14 banknotes in the temporary storing section; and
15 dispensing the accumulated predetermined number of acceptable length
16 discharged banknotes in the temporary storing section through a dispensing slot.